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STUDIES ON THE VIRUS OF HOG CHOLERA.*

PRELIMINARY REPORT.

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This preliminary report is presented for the purpose of recording certain observations, which have been made by the aid of the dark field on the blood of hogs suffering from hog cholera. During the last few months a spirochete has been found with uniformity and constancy in the blood of every cholera hog examined. Practically all of these positive findings have been controlled by one or more careful dark field examinations of the blood before inoculation. Additional checks are furnished in several cases by negative findings subsequent to positive results in blood of hogs recovered from the disease.

In this work the fresh blood of normal and diseased hogs is collected aseptically in sterile sodium citrate solution. It is then examined at once with the dark field. The blood of normal hogs thus examined may show, in addition to the normal structures, a few granular bodies, sometimes a few bacterial cells from possible extraneous contamination, and filaments. The latter may assume the form of "dumb bells," "chains," or flexible filaments, which by an untrained observer might easily be mistaken for spirochetes. An excellent description of these bodies as well as others found in the blood of normal animals is given by Balfour.[1]

In so far as the present results go, the practiced observer can readily distinguish certain characters in the blood of animals suffering from hog cholera when placed on the dark field, as differentiated from normal hog blood. It usually contains many granules, some very fine yet distinctly larger than blood dust, some larger still, and some very distinct, highly refractive bodies. It is possible that some or all of these granules represent disintegrated blood elements resulting from the disease.

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[1] *Fourth Report, Wellcome Tropical Research Laboratories.*

In the specimens of blood from all infected hogs which have been observed on the dark field, a relatively large spirochete has been found. It averages from five to seven microns in length and one micron in width. The body of the organism is flexible, round and blunt at its ends. It is actively motile and revolves about its longitudinal axis. Its motility is undulating in character and its spirals are fixed. Several of these have been observed dividing longitudinally. In one permanent microscopical mount, prepared by india ink fixation, one of these organisms shows a polar flagellum. This spirochete is readily distinguished from bacteria on account of its lack of rigidity and characteristic motility, and from "blood filaments" by its refractive properties and characteristic morphology.

To date, positive findings of this spirochete are recorded in the following strains of virus:

1) Michigan strain of hog cholera virus (originally B.A.I. strain of virus).—In the blood of seven hogs, all checked by dark field examinations of normal blood, except the first one, in which was observed the spirochete.

2) Michigan strain (Demerick farm).—In six hogs all checked by normal examinations, except the first two, which were suffering from hog cholera when received from the owner.

3) Indiana strain.—In one hog controlled by negative findings in blood 24 hours after inoculation.

4) Michigan strain (Rochester).—In seven hogs all of which were showing symptoms when received. In these animals diagnosis was practically made by means of the dark field.

5) California strain.—In one hog, checked by repeated examinations of blood before inoculation.

6) Kansas strain.—In one hog checked by examination of blood before inoculation.

7) Ohio strain (Pettigrew).—In one hog checked by examination of blood before inoculation.

8) Unknown (mixed) strain of virus.—In four hogs, infected through natural exposure. These hogs were supposed to be healthy and after obtaining positive findings in the blood of one, physical inspection showed that all were manifesting early clinical symptoms of hog cholera.

9) Controls are furnished by repeated negative findings in two untreated animals kept for a time as checks, by repeated negative findings in four "natural immunes," and in six animals which became convalescent and finally recovered.

To date 33 hogs have been under observation, 130 dark field examinations have been made, and permanent microscopical preparations of the organism in the B.A.I., Indiana, and Rochester strains of virus have been secured.

Two experiments have been made relative to the horse serum virus phenomenon,[1] which showed the presence of the spirochete in the horse serum virus.

The data thus far collected in this investigation are limited and do not warrant the formation of definite conclusions as to the etiological significance of the findings. The details of the experiments and additional material will be presented in a later publication.

[1] King and Wilson, *Jour. Infec. Dis.*, 1912, 11, p. 441.